Continuity of life

Lesson plan and teacher's notes · Form 1 Biology · 1 period of 40 minutes

School	(write school name)	**Teacher**	(write name)
Date	(date)	**Class**	Form 1
Subject	Biology	**Enrolment**	Boys ___ Girls ___ Total ___
Time	40 minutes	**Topic**	Continuity of life

Learners explain that continuity of life means organisms reproducing so that their species continues, compare asexual and sexual reproduction, describe budding, binary fission, spore formation and vegetative propagation, describe reproduction from seeds and vegetative parts, and state how viruses, protozoa, bacteria and fungi reproduce. Examples come from planting seeds and cuttings at school.

Specific outcomes

By the end of the lesson, learners should be able to:

1. Explain that continuity of life means living organisms reproducing so that their species continues
2. Compare asexual and sexual reproduction
3. Describe budding, binary fission, spore formation and vegetative propagation
4. Describe how plants reproduce from seeds and from vegetative parts
5. State how viruses, protozoa, bacteria and fungi reproduce

Prior knowledge

- Living things grow and produce young
- Plants grow from seeds
- Plants need water and warmth

Teaching and learning materials

- chalk and board
- exercise books
- trays or tins with moist soil
- seeds and cuttings or other vegetative parts if available

References

Ministry of Education (CDC) Form 1 Biology syllabus and module; 25Schools learners' note: Continuity of life.

Lesson development

Stage and time	Teacher activities	Learner activities
Introduction 5 min	Ask learners how new plants and new animals come to be. Lead them to say that living things make more of their kind. Write the title and key words.	Suggest how new plants and animals appear and copy the title and key words.
Development: asexual and sexual 10 min	Explain that reproduction keeps a species going. Define asexual reproduction as one parent giving clones, and sexual reproduction as the joining of genetic material from two parents. Name budding, binary fission, spore formation and vegetative propagation.	Copy the comparison table and the four ways of asexual reproduction.
Development: plants and microbes 10 min	Explain the planting of vegetative parts and of seeds, with the conditions and the recording days. Then state how viruses, protozoa, bacteria and fungi reproduce, and name the parts of Rhizopus.	Copy the conditions for planting and the summary of microbes in their books.
Practice 10 min	Give the scenarios on the tray of vegetative parts and the bean seeds. Move around and check that learners separate asexual from sexual reproduction.	Work the scenarios in groups, then share answers.
Conclusion 5 min	Ask groups to name one asexual way and one sexual way plants reproduce. Set the homework.	Answer orally and copy the homework.

Teacher's content notes

Read these before the lesson. They are what you need to know, not what to copy onto the board.

Continuity of life

Continuity of life is living organisms reproducing so that their species continues. Reproduction is the basic process through which living things produce new individuals.

Asexual and sexual reproduction

Asexual reproduction involves a single parent, and the offspring are genetically identical to the parent, called clones. Sexual reproduction involves the joining of genetic material from two parents.

Ways of asexual reproduction

Budding is a new organism growing from a bud of the parent, as in yeast. Binary fission is found in prokaryotic organisms such as bacteria. Spore formation produces special reproductive cells, called spores, that grow into new individuals under the right

conditions. Vegetative propagation uses vegetative parts such as tubers, cuttings, buds, leaves, suckers, bulbs, corms, rhizomes and runners.

Planting vegetative parts and seeds

Vegetative parts are planted in moist soil in a warm, bright place out of direct sunlight, and watched on days 1, 5, 10, 15 and 20. Seeds are planted 1 to 2 cm deep and apart, in a warm place without direct light, at 20 to 25 degrees Celsius, and watched for 7 to 15 days. Seedlings develop roots and leaves, and the plant later flowers, leading to fruits and seeds.

Humans

Sexual reproduction in humans is made possible by specialised reproductive structures. At puberty, humans develop secondary sexual characteristics, showing reproductive maturity. Good hygiene keeps the reproductive structures healthy.

Viruses, protozoa, bacteria and fungi

Viruses need host cells and replicate their genetic material, producing new viral particles. Protozoa and bacteria reproduce asexually through binary fission. Fungi reproduce both asexually and sexually and produce spores. Rhizopus has mycelium and hyphae, and the hyphae have three parts: the stolon, the sporangiophore and the rhizoids.

Questions to ask during the lesson

Question	Expected answer
A teacher near Feira asks learners how a farmer gets many cassava plants from a few. A learner says by planting pieces of the plant. (a) Name this type of reproduction. (b) Say how many parents are involved. (c) Say what the new plants are like compared with the parent.	(a) Asexual reproduction by vegetative propagation. (b) One parent. (c) Genetically identical to the parent, clones.
Learners at a school in Luangwa watch a video of a fungus producing spores. (a) Name the type of reproduction shown. (b) Say what a spore is. (c) Say when a spore grows into a new individual.	(a) Asexual reproduction by spore formation. (b) A special reproductive cell. (c) Under the right conditions.
A group near Feira reads that yeast makes new yeast from an outgrowth on the parent. (a) Name this way of reproducing. (b) Say whether it is asexual or sexual. (c) Name one other asexual way from the note.	(a) Budding. (b) Asexual, because it has a single parent. (c) Any one of binary fission, spore formation and vegetative propagation.

Worked examples for the board

Deciding asexual or sexual

Cuttings planted in moist soil grow into new plants from a single parent, and the new plants are identical to it, so this is asexual reproduction. Bean seeds come from flowers after pollination and fertilisation, with genetic material from two parents joined, so this is sexual reproduction.

Recording a planting

A group plants seeds 1 to 2 cm deep and keeps them warm. It records on days 1, 5, 10 and 15 and writes the day on which the first seedlings appear. This gives the time the seeds take to germinate.

Board plan

Write the title and key words. Left: the comparison of asexual and sexual reproduction. Centre: the four ways of asexual reproduction. Right: seeds, vegetative parts, and how viruses, protozoa, bacteria and fungi reproduce.

Feature	Asexual	Sexual
Number of parents	One	Two
Genetic material	Offspring identical to the parent (clones)	Genetic material from two parents is joined

Asexual and sexual reproduction compared

Mistakes to expect

Learners often think	Put it right
Asexual offspring are different from the parent.	Asexual reproduction involves a single parent and the offspring are genetically identical to it, so they are clones.
Only animals reproduce sexually.	Plants reproduce sexually too, through seed production, with flowers as the sites for pollination and fertilisation.
Viruses reproduce on their own like other organisms.	Viruses depend on host cells. They replicate their genetic material using the host cell and produce new viral particles.
Seeds can be planted at any depth and left in the sun.	Seeds are planted about 1 to 2 cm deep, watered so the soil is moist but not waterlogged, and kept in a warm place without direct light, at 20 to 25 degrees Celsius.

Differentiation

Learners who struggle

Give learners a two-column table headed asexual and sexual and a list of examples from the note, and let them copy each example under the correct heading before they explain it.

Learners who finish early

Ask learners who finish early to compare the advantages and disadvantages to a farmer of using seeds and of using vegetative parts, and to say which they would choose for a field near the school.

Hearing or visual impairment

For learners with visual impairment, let them handle seeds, cuttings and moist soil and describe them aloud. For learners with hearing impairment, write each key word and each way of asexual reproduction on the board and use the comparison table.

No projector, no printing

Use tins, soil from the school grounds and seeds or cuttings brought from home, and draw the tables on the board. Learners work in groups without videos or charts.

If time is short

Skip the microbes stage and work only the vegetative parts and seeds scenarios; set the rest as homework.

Evaluation

Question or task	A correct answer shows
A learner at a school near Feira plants pieces of a plant in a tray of moist soil, waters them and records changes on days 1, 5, 10, 15 and 20. After a few weeks new plants grow. (a) Name the type of reproduction shown. (b) Name the kind of plant parts used. (c) Say where the tray should be kept.	(a) Asexual reproduction. (b) Vegetative parts. (c) In a warm, bright place, not in direct sunlight, with the soil kept moist.
A group of learners in Luangwa plants bean seeds 1 to 2 cm deep in a container and watches them for two weeks. (a) Say what the group should record. (b) Name the temperature range that suits germination. (c) Say what the seedlings develop and what the plant later forms after flowering.	(a) The time the seeds take to germinate, noted day by day. (b) Between 20 and 25 degrees Celsius. (c) Roots and leaves, and later flowers that lead to fruits and seeds.
A teacher near Feira tells the class that a virus can reproduce on its own in a bottle of water. (a) Do you agree. (b) Say what a virus needs in order to reproduce. (c) Say what the virus produces.	(a) No. (b) A host cell, which it uses to replicate its genetic material. (c) New viral particles.

Homework

A learner at a school near Feira studies a fungus called Rhizopus under a teacher's guidance. (a) Name the two parts that make up Rhizopus. (b) Name the three parts of its hyphae. (c) Say what fungi produce that can grow into new individuals.

Extra practice with answers

Question	Answer

1. A learner at a school near Feira plants pieces of a plant in a tray of moist soil, waters them and records changes on days 1, 5, 10, 15 and 20. After a few weeks new plants grow. (a) Name the type of reproduction shown. (b) Name the kind of plant parts used. (c) Say where the tray should be kept.	(a) Asexual reproduction. (b) Vegetative parts. (c) In a warm, bright place, not in direct sunlight, with the soil kept moist.
2. A group of learners in Luangwa plants bean seeds 1 to 2 cm deep in a container and watches them for two weeks. (a) Say what the group should record. (b) Name the temperature range that suits germination. (c) Say what the seedlings develop and what the plant later forms after flowering.	(a) The time the seeds take to germinate, noted day by day. (b) Between 20 and 25 degrees Celsius. (c) Roots and leaves, and later flowers that lead to fruits and seeds.
3. A teacher near Feira tells the class that a virus can reproduce on its own in a bottle of water. (a) Do you agree. (b) Say what a virus needs in order to reproduce. (c) Say what the virus produces.	(a) No. (b) A host cell, which it uses to replicate its genetic material. (c) New viral particles.
4. A learner at a school near Feira studies a fungus called Rhizopus under a teacher's guidance. (a) Name the two parts that make up Rhizopus. (b) Name the three parts of its hyphae. (c) Say what fungi produce that can grow into new individuals.	(a) Mycelium and hyphae. (b) The stolon, the sporangiophore and the rhizoids. (c) Spores.

Answers to the learners' check-yourself questions

1. What does continuity of life mean.
   Living organisms reproducing so that their species continues.
2. Name the two modes of reproduction and say how many parents each needs.
   Asexual reproduction needs one parent. Sexual reproduction needs two parents.
3. Name the four ways in which asexual reproduction can happen.
   Budding, binary fission, spore formation and vegetative propagation.
4. Name three vegetative parts of plants that can grow into new plants.
   Any three of tubers, cuttings, buds, leaves, suckers, bulbs, corms, rhizomes and runners.
5. Name the three parts of the hyphae of Rhizopus.
   The stolon, the sporangiophore and the rhizoids.
6. A learner at a school near Feira plants pieces of a plant in a tray of moist soil, waters them and records changes on days 1, 5, 10, 15 and 20. After a few weeks new plants grow. (a) Name the type of reproduction shown. (b) Name the kind of plant parts used. (c) Say where the tray should be kept.
   (a) Asexual reproduction. (b) Vegetative parts. (c) In a warm, bright place, not in direct sunlight, with the soil kept moist.
7. A group of learners in Luangwa plants bean seeds 1 to 2 cm deep in a container and watches them for two weeks. (a) Say what the group should record. (b) Name the temperature range that suits germination. (c) Say what the seedlings develop and what

the plant later forms after flowering.

(a) The time the seeds take to germinate, noted day by day. (b) Between 20 and 25 degrees Celsius. (c) Roots and leaves, and later flowers that lead to fruits and seeds.

Teacher's reflection

What went well:

What I will change next time:

Learners who need follow-up: